DEPARTMENT OF METHODS, REVIEWS, ABSTRACTS, AND BRIEFER ARTICLES

ABNORMAL EARTHWORM SPECIMENS, *HELODRILUS SUBRUBICUNDUS* AND *H. TENUIS**

By
Frank Smith
University of Illinois

Comparatively little attention has thus far been given to abnormalities in the relations of the reproductive organs of earthworms. Variations from the normal positions and number are sometimes found, and asymmetrically placed gonads and openings of efferent ducts are not infrequently encountered. Since further investigation of such abnormalities may lead to at least a partial understanding of their relation to disturbances in the normal developmental activities of the animals concerned, it seems advisable to record the more important details in the structure of specimens representative of some of the more common types of such abnormalities, if indeed it be found that there are such types.

A specimen of *Helodrilus subrubicundus* (Eisen) recently collected at Urbana, Illinois, in the banks of a stream heavily contaminated with sewage was found to have the spermiducal pores on somite 14 instead of in the usual position on the fifteenth somite. Sagittal sections of the left half of the anterior part were made and unexpected irregularities were found. Spermaries and spermiducal funnels are present in the usual positions in 10 and 11. An ovary and oviducal funnel are present in the usual positions in 13; but an additional one of each, equally well developed, have similar positions in the twelfth somite which normally has no gonads. An oviducal pore is present in the usual position on 14, and in addition there is a supernumerary one on 13, related to the oviducal funnel of 12. The spermiducal pores on 14 are slightly laterad of the oviducal pores of the same somite. Sperm sacs in 9, 11, 12, and an ovisac in 14 have the usual location and relations. The calciferous gland, crop, and gizzard also have the usual location and relations; but the most posterior heart is in 10 instead of in the usual position in 11; and the lateral longitudinal vessel branches off from the dorsal vessel in 11 instead of in the usual place in 12. The ventral setae of 9 are modified to genital setae which are of about twice the length of ordinary setae and relatively more slender.

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The presence of extra gonads in 12 is not infrequently met with, but the presence of spermiducal and oviducal pores on the same somite (14) is decidedly unusual, in the experience of the writer, but has been found also in another specimen, described below.

A specimen of *Helodrilus tenuis* (Eisen) collected near Urbana, Illinois in a fallen and decaying tree, attracted attention because the spermiducal pores were asymmetrically placed, the one on the right side being normally situated on 15, while that of the other side opened on the somite next anterior. Sections were made and the asymmetrical relations were found to extend to internal organs. Reproductive organs of the right side were found in normal positions and relations, as follows: spermaries and spermiducal funnels in 10 and 11; an ovary and oviducal funnel in 13; oviducal pore on 14; and the spermiducal pore on 15. In the left half of the worm, there are spermaries and spermiducal funnels in 9, 10, 11; ovaries and oviducal funnels in 12 and 13; oviducal pores on 13 and 14; and a spermiducal pore on 14, laterad of the oviducal pore of that somite. The extra gonads and associated funnels are as large and well developed as the normal ones. Paired sperm sacs in 11 and 12 are in the locations normal for this species. No irregularities in the location of hearts and lateral longitudinal vessels have been noticed; and the alimentary tract has normal relations, except that the anterior evagination of the calciferous gland in the left half of the worm is found anterior to the septum 9/10, and the one in the right half is anterior to 10/11 which is the more normal position.

Asymmetry in the number and position of various organs in the right and left halves of specimens is of fairly frequent occurrence and often involves circulatory and alimentary systems as well as the reproductive organs. It will be noticed that the presence of both spermiducal and oviducal spores on 14 is associated, in the two specimens described above, with the presence of ovaries and oviducal funnels in both 12 and 13; but such association may be a mere coincidence rather than an actual correlation.